Oregon

Upper Grande Ronde Basin
Section 319
National Monitoring Program Project

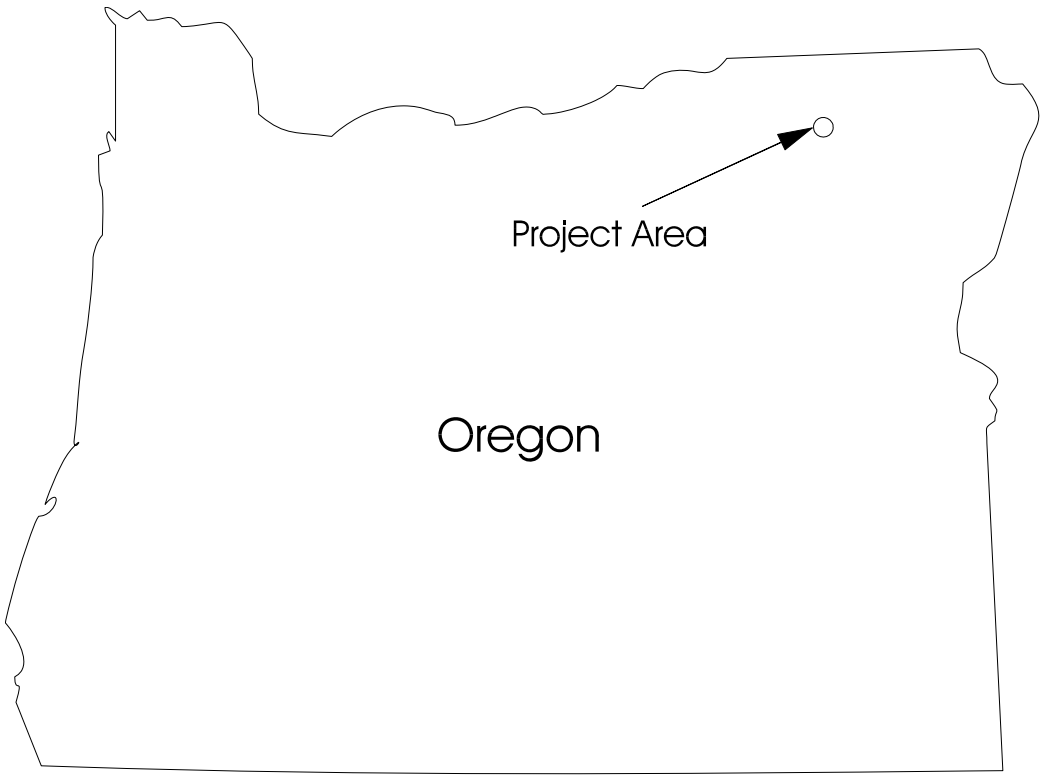

Figure 36: Upper Grande Ronde Basin (Oregon) Project Location

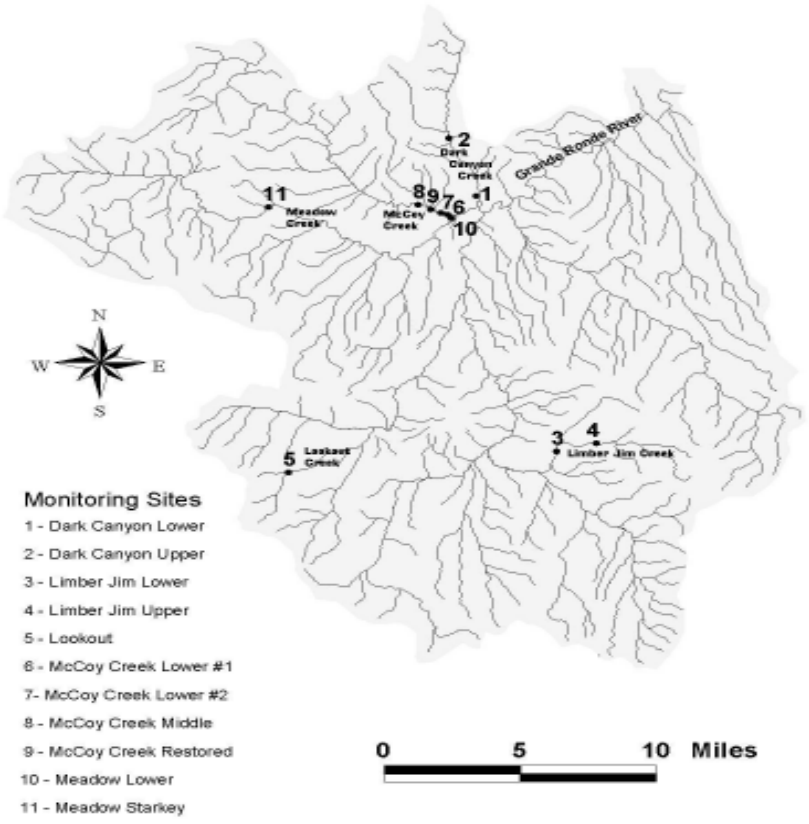

Figure 37: Biological and Water Quality Monitoring Stations in Selected Watersheds within the Upper Grande Ronde Sub-basin (Oregon)

PROJECT OVERVIEW

The Upper Grande Ronde Basin (695 square miles) is located in the Columbia Intermontane Central Mountains of northeast Oregon (Figure 36). The Grande Ronde River traverses primarily forest and grazing lands draining into the Snake River, a major tributary of the Columbia River. The study area is included in the ceded lands of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and is a culturally significant area.

The watershed has historically been important for anadromous fish production, but from about 1970 to the present fish numbers have been declining. Land use activities, such as grazing, timber harvest, road construction, and mining, have been cited as contributing to fish and other aquatic species' habitat degradation (Bach, 1995).

Water temperature and loss of physical habitat have been identified by the US Forest Service (USFS) as the most important factors affecting spring Chinook salmon and steelhead populations (Hafele, 1996). An important cause of increased stream temperature is the loss of riparian vegetation. It has been estimated that land use activities have reduced stream shading from a potential of 80% to a total of 28% (Hafele, 1996). As a result of these and other water quality violations (primarily pH), the Grande Ronde has been listed by the Oregon Department of Environmental Quality (ODEQ) as water quality limited.

From 1993 through 2005, ODEQ conducted a water quality monitoring program has been conducted by ODEQ to evaluate the basin's biological communities and the physical and chemical factors that affect them. This monitoring project was part of the US Environmental Protection Agency (USEPA) Section 319 National Monitoring Program. The monitoring effort targeted five subbasins within the Upper Grande Ronde Basin. Water quality monitoring was based on a paired watershed design for two highly impacted basins, while other basins represented a range of less impacted control sites. Additionally, an upstream/downstream approach was used to evaluate changing land use along individual streams. The major monitoring components included habitat, macroinvertebrates, fish and water quality. Significant measures of success were reduction in maximum summer temperatures, improved habitat for aquatic life, and increased biotic index scores for fish and macroinvertebrates. Restoration work was focused on McCoy Creek, a tributary of Meadow Creek.

The Upper Grande Ronde Basin 319 National Monitoring Program project has evolved from local, state, and tribal cooperation. In 1995, a watershed assessment was completed by ODEQ under the Oregon Watershed Health Program (Bach, 1995). In 2000 ODEQ developed Total Maximum Daily Load (TMDL) waste load allocations for the basin and is now implementing the management plan for the TMDL. The USFS has developed a restoration plan for anadromous fish in the Upper Grande Ronde Basin and identified desired future conditions (Hafele, 1996). Stream habitat restoration activities aimed at improving habitat conditions have been implemented on McCoy Creek in cooperation with the landowner and CTUIR.

The project wrapped up seven years of post-BMP monitoring in 2005. The final project report has been completed (Whitney, 2007). Other technical reports have been published using project results and are available on-line at http://www.deq.state.or.us/lab/techrpts/bioreports.htm. Future monitoring at five year intervals may be conducted for long term tracking of restoration effectiveness.

PROJECT BACKGROUND

Project Area

The Upper Grande Ronde Basin Monitoring Project consists of ten study sites in five subbasins located within the Blue Mountain ecoregion (Omernick, 1987). The total area of the Upper Basin is approximately 695mi^2 (1,800 km^2), with 1,000 mi (1,609 km) of stream (Bach, 1995).

Relevant Hydrologic, Geologic, and Meteorological Factors

The study region is characterized by a semi-arid climate and rugged mountains in the headwater areas. Temperature and precipitation vary with elevation, which ranges from approximately 2,300 to 7,800 ft (700 to 2,380 m) The climate is characterized by warm, dry summers and cold, moist winters. At elevations above 5,000 ft (1,524 m), average annual precipitation is greater than 50 in (127 cm), and usually occurs as snow (Bach, 1995).

Slopes vary throughout the basin, with relatively gentle slopes in the valley and steeper slopes (as high as 90% in some areas) in the upper parts of the watershed (Bach, 1995). The combination of slope, rainfall, and snowpack can lead to large runoff events in the mid and upper elevations.

Land Use

Approximately 60% of the land in the Grande Ronde Basin is devoted to forestry, while approximately 36% is agricultural. Land use activities such as grazing, timber harvesting, road construction, and livestock practices have been cited as causes for beneficial use impairment. Land ownership in the Upper Basin is approximately 53% private and 47% federal. The only two land use/cover types present in the study subbasins are range and evergreen forest.

Water Resource Type and Size

The total drainage area of the Upper Grande Ronde Basin is approximately 695 mi^2 (1,800 km^2 with a stream density of 1.44 mi/mi^2)(1.12 km/km^2). Eleven sites from five subbasins located in the upper southwest portion of the watershed were selected for this monitoring project.

McCoy Creek	55.3 mi^2 (143.4 km^2)	paired basin (4 sites)
Dark Canyon Creek	18.8 mi^2 (48.7 km^2)	paired basin (2 sites)
Meadow Creek	56.2 mi^2 (145.6 km^2)	paired basin (2 sites)
Lookout Creek	15 mi^2 (38.8 km^2)	single site (1 site)
Limber Jim Creek	18.8 mi^2 (48.7 km^2)	paired basin (2 sites)

Water Uses and Impairments

The designated beneficial uses of concern in the basin include anadromous populations of spring/summer Chinook salmon, summer steelhead, and resident populations of bull trout.

Important beneficial uses of the streams that drain the watershed include cold water fish migration, spawning, and rearing; domestic and agricultural water supply; primary and secondary contact recreation; and wildlife habitat.

Reduced fish populations of spring chinook and steelhead, as well as impaired aquatic life (macroinvertebrates), are the main beneficial uses impaired in the Upper Grande Ronde Basin. Spring Chinook adult populations dropped from 12,200 individuals in 1957 to less than 400 in 1989 (USFS, 1992). Water quality has been documented as severely impaired for excessive sedimentation and high water temperatures. Riparian vegetation has been classed as moderate to severely degraded throughout the watershed (DEQ, 1988). Also, large pool habitat has declined by 59% since 1941 (Everest & Sedell, 1991). Restoration work is designed to lower water temperature and increase habitat for native salmonids.

Pollutant Sources

The major sources of nonpoint source temperature pollution are loss of riparian habitat through historic grazing practices and channel modifications.

Pre-Project Water Quality

Most water chemistry violations (mostly pH) in the Grande Ronde Basin have been shown to occur in the main stem of the Grande Ronde. Water chemistry results for 1993-95 documented no significant water chemistry problems for the ten study sites based on sixteen parameters.

Monitoring of habitat conditions indicated that Lookout Creek has the most stable and highest quality habitat with Dark Canyon Creek the lowest. Habitat conditions in McCoy Creek showed impaired conditions at the two lower sites and moderately impaired at the upper site. Lower McCoy Creek was characterized by channelized banks, little riparian vegetation, and shallow pools and riffles, and was the target of the stream restoration efforts.

Water temperature has been identified as a significant factor affecting both water quality and biological communities in the Grande Ronde. Temperature in the basin has been characterized by placing continuous recording thermographs at the top and bottom of each stream reach selected for bioassessment. For the Grande Ronde Basin, the water temperature standard is based on the 7-day maximum mean and should not exceed 17.8°C for cold water species when salmonids are not spawning; water temperature should not exceed 12.8°C during salmonid spawning and incubation. The 17.8°C temperature maximum applies to the study sites during July, August and September. This maximum temperature is typically exceeded at all sites except Upper Limber Jim Creek. The sites on McCoy Creek, Dark Canyon Creek and Meadow Creek generally exceeded the standard throughout the sampling period (Whitney, 1999).

Water Quality Objectives

Project objectives were:

- To improve salmonid and aquatic macroinvertebrate communities in McCoy Creek by restoring habitat quality and lowering stream temperatures.
- To quantitatively document a cause-and-effect relationship between improved habitat, lower water temperatures and improved salmonid and macroinvertebrate communities.

Differences in fish and macroinvertebrate communities and pre-project water quality results suggested that the above objectives were feasible. The results of snorkel surveys for fish completed during the summers of 1994 through 1997 showed two interesting factors:

- Rainbow trout were present in all streams, including Meadow and McCoy Creeks, where summer temperatures exceed 25°C, well above the acceptable range for trout. Temperature measurements indicate a 5°C gradient was present in pools as shallow as 18 inches. These areas of temperature refugia may be critical for fish survival under the temperature conditions of streams like Meadow and McCoy Creeks. Pool temperature stratification studies conducted in 1996 confirmed the presence of temperature refugia in pools over two feet in depth.
- Fish communities at Meadow and McCoy creeks were dominated by warm water red-sided shiner and dace. These species were scarce or completely absent at the other study sites, presumably because of cooler water temperatures. It is expected that fish communities will shift from one dominated by red-sided shiner and dace to one dominated by trout in the McCoy reaches if water temperatures can be lowered by restoration work.

Macroinvertebrate results from 1993, 1994, and 1995 show a similar pattern to the fish surveys and temperature results. It is expected then that if temperatures in McCoy Creek can be improved through habitat restoration, the macroinvertebrate and fish communities will respond favorably and that these responses can be measured.

Project Time Frame

1993 to 2007

PROJECT DESIGN

Nonpoint Source Control Strategies

The nonpoint source treatment implemented in the study area consisted of stream channel and riparian restoration on the lower reach of McCoy Creek. This site is located on a private ranch on the lower mile and a half of McCoy Creek. Lower McCoy Creek is characterized by channelized banks, little riparian vegetation, and shallow pools and riffles. In 1968 and again in 1977 the lower two miles of McCoy Creek were channelized, straightened, and relocated to drain wetlands and maximize grazing land. These actions produced a wide, shallow channel and resulted in near elimination of out of bank stream flow and a significant decrease in meadow storage capacity and connectivity with cool ground water. The focus of restoration was to reverse the adverse effects of channelization.

Riparian fencing has been in place on lower McCoy Creek since 1988; however, response of the stream channel to livestock exclusion was limited. Channel restoration was initially implemented in July, 1997 when a half mile section of the channelized creek was reintroduced into its historic meandering wet meadow channel in the upper meadow area to redevelop meanders, better pool quality, and more habitat complexity. A second phase was completed in September 2002, with the diversion of an additional 1.2 mile (1.9 km) section of channelized creek into a constructed meandering channel in the lower meadow area. In addition, a new bridge and culvert were constructed at a road crossing in October, 2001. This work was accomplished by extensive riparian planting and the creation of off-channel pond habitats. The working hypothesis was that restoring wet meadow conditions and improving riparian vegetation cover would result in cooler stream temperatures and improved fish habitat within the restoration area.

A number of study reaches were involved in restoration and evaluation:

Study Reach	Sample Period	Study Design Type	Treatment
McCoy Creek Middle	1993-2005	Upstream, Before and After Treatment	Cattle excluded by fencing beginning in 1988. Forested habitat feeding into McCoy Meadows area.
McCoy Creek Lower #1 and #2	1993-2001	Down Stream, Before and After Phase 1 Treatment	Channelized with cattle excluded by fencing beginning in 1988. Diverted to Phase 2 reconstructed channel in 2002.
McCoy Creek Restored	1997-2005	Treated – Phase 1 Restoration	Section of historic meandering channel restored by diverting water from adjacent channelized section in 1997.
McCoy Creek Lower Reconstructed	2003-2005	Treated – Phase 2 Restoration	Reconstructed meandering channel. This section replaced McCoy Creek Lower #1 and #2 in 2002. Cattle remained excluded.
Dark Canyon Creek Lower	1993-2003	Control – Before and After Treatments	Cattle grazing with no riparian fencing. Cattle used the active stream channel.
Meadow Creek Lower	1993-2005	Control – Before and After Treatments	Located in McCoy Meadows – Cattle excluded by fencing beginning in 1988.
Limber Jim Creek Lower	1993-2005	Reference – Before and After Treatments	Open meadow habitat in a sub-basin with grazing excluded and minimal human disturbance.

Water Quality Monitoring

To assess the effectiveness of restoration efforts on McCoy Creek, a sampling design was implemented that included paired watersheds (USEPA, 1993), upstream and downstream monitoring, and

reference sites. In addition to restoration effectiveness monitoring, this study offered the opportunity to assess stream conditions relative to different land use practices. Altogether thirteen study reaches were selected on wadeable streams in five sub-basins of the upper Grande Ronde River. The reaches represented a range of conditions related to habitat type, land use, and management practices. Reach elevations ranged from 3,300 to 4,700 ft (1,006 to 1,432 m). The least disturbed reaches occurred in subbasins with minimal or no grazing at higher elevations. The remaining reaches were located in sub-basins with varying levels of grazing use.

The paired watershed design compared monitoring results between treated and untreated subbasins before, during, and after treatment (restoration). McCoy Creek was the treatment sub-basin, and Dark Canyon Creek was the control . Dark Canyon Creek was selected because it was located in close proximity to McCoy Creek, and was similar in elevation and size. Both McCoy Creek and Dark Canyon Creek have histories of grazing and degraded habitat. The Dark Canyon sub-basin has been used for cattle grazing with no riparian fencing or other improvements. This use was unchanged throughout the duration of the study.

Several other study reaches were monitored. The Meadow Creek Lower study reach also provided a set of control data. This reach was located in McCoy Creek Meadows, just upstream from the McCoy Creek confluence. Lower Meadow Creek was fenced for livestock exclusion in 1988, as was Lower McCoy Creek. This remained unchanged throughout the duration of the study. For upstream (above restoration) and downstream (below restoration) comparisons, the McCoy Creek Middle site and the McCoy Creek Lower #1 and #2 sites bracketed the upper and lower boundaries of the restored (Phase 1) section of McCoy Creek. The Middle site remained unchanged through the study period, but the creek was diverted away from the Lower sites in 2002 during the Phase 2 channel reconstruction. Data from McCoy lower 1 and 2 sites represent conditions in the meadow area before phase 1 and phase 2 channel restoration.

Limber Jim and Lookout Creek sites provide data from least disturbed reaches and set reference benchmarks by which to evaluate the effects of land use and expected benefits of restoration. The Limber Jim Creek Lower Reach was the best available choice for reference comparisons because it was protected from grazing and located in meadow habitat similar to the McCoy Creek restoration area.

Variables Measured

Biological

Habitat
Macroinvertebrates
Fish

Chemical and Other

Continuous water temperature
Specific conductivity
Alkalinity
Dissolved oxygen (DO)
pH
Ammonia (NH_3)
Biochemical oxygen demand (BOD)
Total organic carbon (TOC)
Turbidity

Covariates

Continuous air temperature
Discharge
Precipitation (from nearby climate station)
Shading and solar input
Time of travel
Slope or gradient
Width/depth measurements

Sampling Scheme

Water quality monitoring was generally conducted between early April and early October. Air and water temperature were measured continuously at each site throughout the monitoring season. Water quality, habitat, and macroinvertebrate surveys were conducted three times and fish snorkel surveys were done once during each monitoring season in late July or early August in the period of peak stream temperatures. The methods used for identifying sites were based on a modified Hankin and Reeves procedure (Hafele, 1996). The habitat and macroinvertebrate assessment procedures followed Oregon's biomonitoring protocols.

Water quality, habitat, and macroinvertebrate samples were collected spring, summer, and fall each year. The spring sampling has proved to be problematic. Restrictions due to snowpack and high water levels have resulted in incomplete sampling, and results show that summer and fall samples identify differences between sites better than spring samples. For these reasons, spring sampling for these variables were discontinued. The schedules for fish surveys and continuous temperature monitoring remained unchanged.

In addition to the scheduled snorkel surveys, a more intensive fish and habitat survey was completed on lower McCoy Creek in August, 2001. This survey was designed to better define the relationships between pool depth, water temperature, and the spatial distribution of salmonid species. The section surveyed was replaced by the second reconstructed section of McCoy Creek in July 2002. A similar survey was conducted on the new reconstructed section in July 2003, and again in July 2005. The data collected were useful in assessing the benefits of this new channel reconstruction.

Time of travel data, used in temperature modeling, were collected during the 1996 monitoring season and will be collected again after restoration work is completed. Pool volumes and detailed temperature refugia measurements were collected during the 1996 monitoring season. Photo and video images taken at all study sites during summer low flows documented habitat conditions before and after restoration.

Monitoring Scheme for the Upper Grande Basin Watershed 319 National Monitoring Program Project

Design	Sites or Activities	Primary Parameters	Covariates	Frequency of WQ Sampling	Frequency of Biological/Habitat Assessment	Duration
Paired Upstream/ downstream	McCoy Creek Dark Canyon Creek	Habitat Macroinvertebrate Fish Water temperature Water Chemistry	Air temperature Discharge Precipitation	3 times yearly	3 times yearly (fish once per year)	4 years pre-BMP 1 yr BMP 5 yr post-BMP

Land Treatment Monitoring

The channel restoration work on McCoy Creek has been extensively documented. Photo points have been established and before and after photos have been taken. Habitat condition including vegetation, channel form, gradient, cover, and pool quality have been collected in the restored reach along with all other monitored parameters (water quality, continuous temperature, macroinvertebrates, and fish). Besides monitoring work by DEQ, the CTUIR and the Oregon Dept. of Fish and Wildlife have also collected data concerning vegetation and fish populations in the restored channel reach.

Modifications Since Project Start

The number of sites and sampling frequency were modified as the study progressed. The McCoy Creek Upper site was dropped early in the project (July, 1994) because it was found to be dry during

the summer season. Sampling of the Dark Canyon Creek Monitoring at the upper site was terminated in April, 1998 because of access difficulties. Sampling of the Dark Canyon Creek Lower site ended in September, 2003 because of access problems. In 2002, the spring season was dropped monitoring at all study reaches, while continuous temperature and annual fish surveys continued as usual. This decision was based on several factors: First, the spring monitoring runs often resulted in incomplete data; High flows prohibited or limited complete instream sampling, and snow sometimes blocked access to higher elevation sites. Second, preliminary analyses showed spring data did not discriminate well between sites compared to summer and fall results. In 2005, monitoring frequency was reduced to a fall sample at five key sites, which were the McCoy Creek sites, Meadow Creek Lower, and Limber Jim Creek14 Lower. The annual fish survey and continuous temperature monitoring were conducted as usual at these sites, and additional temperature and biological replicate sampling were done in 2005.

Progress to Date

A half-mile section of McCoy Creek was reintroduced into its historic meandering channel in July, 1997, with accompanying vegetation planting and wetland reclamation and development in the abandoned channelized section. Additional planting and fence relocation was completed between 1999 and 2001. Construction of a new bridge to accommodate McCoy Creek at the previously constricted McIntyre Road crossing was completed in October 2001. In conjunction with the bridge construction, an additional half-mile section of meandering channel was constructed in the meadow area below the bridge. Water was diverted from the existing channel into this newly constructed section in August of 2002. At that time, temperature monitoring equipment was installed. Monitoring of water quality, habitat, macroinvertebrates, and fish began on this new section in July 2003. DEQ, in cooperation with BLM and US Forest Service, completed Proper Functioning Condition (PFC) assessments on the McCoy Creek reaches and its paired watersheds in 1998. PFC is used widely in the West as a quick assessment tool to determine a stream's channel stability and identify management practices that need changing to improve channel conditions. The extensive data set of water quality, habitat and aquatic biota collected for this project provides a unique opportunity to compare PFC assessments with more intensive monitoring techniques.

The project has been completed and a final report published in June, 2007.

DATA MANAGEMENT AND ANALYSIS

Data Management and Storage

Field and laboratory water chemistry test results and continuous water temperature data were reviewed and stored in the DEQ Laboratory Storage and Retrieval (LASAR) database. Habitat, macroinvertebrate, and fish data were entered into a separate ACCESS database managed by the DEQ Watershed Assessment Section. Supplemental monitoring results and data were managed separately by the project leader.

STATISTICA software was used for data analysis and graphing.

NPSMS Data Summary

Currently unavailable.

Final Results

This project demonstrated that channel restoration can improve habitat and water quality for sensitive aquatic species, including rainbow trout. However, recovery may not be apparent using traditional water column measurements.

Results showed a clear response in stream conditions relative to land use practices and an overall improvement in McCoy Creek as a result of the channel restoration efforts. Sites with minimal land use disturbance were associated with higher quality habitat, and were characterized by narrower, deeper channels with more shade, cooler water temperatures, and better water quality when compared to sites with histories of land use such as livestock grazing and channelization. Macroinvertebrate assemblages at the sites with minimal use compared more closely to regional reference site expectations, and these sites were populated primarily by rainbow trout, while sites with heavier use were populated by more tolerant fish species.

Fish results from Dark Canyon Creek, where habitat was poor but water temperature was cool due to extensive cool ground water influx, demonstrated the importance of water temperature as it affected fish species composition. Results from all sites showed that numbers of rainbow trout declined sharply when yearly seven day average water temperatures exceeded 23 ^{o}C, and that areas of cool water refuge became important for trout survival as temperatures increased.

Although there was an apparent gradual improvement in McCoy Creek after livestock fencing was in place, the healing process was slow. Habitat quality remained poor. The channel remained simplified, shallow and wide, with little riparian vegetation providing cover and shade. Water temperatures were high, and little cool water refuge was available for trout survival. However, following the 1997 phase 1 and the 2002 phase 2 channel restoration efforts, improvements were clearly achieved. Water quality improved following restoration. Habitat was clearly improved; the narrower, deeper channel and elevated water table renewed wet meadow functionality and created more areas of complex habitat and cool water refuge for fish and other aquatic life.

While chemistry and habitat results clearly showed improvement in McCoy Creek following restoration, temperature, macroinvertebrate, and fish results were more ambiguous. Reach scale temperature data from well mixed water column measurements did not show overall improvement in the combined years following restoration; however, sub-reach scale profiles showed improvement in cool water habitat associated with pools and ground water influx. Additionally, temperature decreased over time in the phase 1 restored reach, while temperatures increased in non-restored reaches and in the study control reach during the same time period. The macroinvertebrate response to restoration was an increase in abundance and taxa richness; however, the assemblage was changing or adjusting over the initial 3 to 5 years following restoration, so it was difficult to determine if the response was simply due to colonization of new habitat or an indication of improvement. Fish assemblage composition did not change notably in McCoy Creek following restoration; however, the number of trout in the phase 1 restored section increased progressively over time.

Results from this study suggest the following conclusions:

- Livestock exclusion by itself may not result in improved habitat and recovery of sensitive aquatic life if stream channel conditions and habitat remain degraded

- Restoration of meandering wet meadow channels can improve habitat and benefit sensitive aquatic life in a relatively short time frame (2-5 years).

- Water temperature and areas of temperature refuge can be critical to the survival of salmonids through summer rearing periods.

- Improvements may not be detected using reach scale water column temperature measurements. Smaller scale quantification of thermal refugia may be more appropriate.

• Macroinvertebrate assemblages responded to habitat and water quality conditions and showed improving trends following restoration. Due to initial colonization of new habitat, however macroinvertebrates may require 2-5 years to establish a stable assemblage.

INFORMATION, EDUCATION, AND PUBLICITY

There has been little quantitative documentation of the effects of habitat restoration on stream temperatures and aquatic communities. The Upper Grande Ronde Basin Monitoring project will provide useful information on the effects of channel and riparian restoration on fish and macroinvertebrate habitat improvement for areas elsewhere in the basin. This project will also enhance interagency coordination among other agencies and watershed councils which have expressed interest in restoration work. Interagency cooperation is reflected by the involvement in this project of Oregon Department of Fish and Wildlife (ODF&W), NRCS, local Soil and Water Conservation Districts (SWCD), USFS, USEPA, and the CTUIR.

Education and outreach efforts are occurring primarily through tours of the project area. Tours have been conducted by the Confederated Tribes of the Umatilla, the local Soil & Water Conservation District (SWCD), and DEQ. Tour participants have included other private landowners and state and federal agency personnel. There is not a newsletter designed to specifically cover this project, though it has been discussed in the local newspaper and at board meetings of the Grande Ronde Model Watershed Board. The Model Watershed Board is funded to oversee and coordinate restoration work in the Grande Ronde Basin.

The following are reports written using data from the upper Grande Ronde Basin Section 319 National Monitoring Program Project. These reports are posted on the Oregon Department of Environmental Quality website: *http://www.deq.state.or.us*. Navigate to Laboratory, Technical Reports, Biomonitoring Technical Reports:

Bio 2000-01 Grande Ronde National Monitoring Program Project Temperature Monitoring Summary Report

Bio 2000-06 Grande Ronde Section 319 National Monitoring Program Project Fish Survey Report 1994-1999

Bio - 006 Analysis of Macroinvertebrate Data from the Grande Ronde Long Term NPS Project 1993-1996

Bio - 012 Multivariate Analysis of Fish and Environmental Factors in the Grande Ronde Basin of Northeastern Oregon

TOTAL PROJECT BUDGET

The estimated budget for the Upper Grande Ronde National Monitoring Project for the life of the project is based on 10 years of funding, with seven years completed (1993–1999):

Project Element	**Funding Source ($)**				
	Federal	**State**	**Local**	**Tribal**	**Total**
Proj Mgt	230,000	92,000	NA	NA	322,000
I&E	NA	NA	NA	NA	NA
LT	185,000	NA	NA	70,000	255,000
WQ Monit	470,000	188,000	NA	NA	658,000
TOTALS	885,000	280,000	NA	70,000	1,235,000

Source: Rick Hafele, personal communication (1996).

IMPACT OF OTHER FEDERAL AND STATE PROGRAMS

The Upper Grande Ronde Basin Monitoring Project is a major component of the Grande Ronde Watershed Enhancement Project, a cooperative effort between ODEQ, EPA, NRCS and Union County SWCD.

The National Marine Fisheries Service (NMFS) listed the Snake River spring/summer Chinook salmon as an endangered species under the Endangered Species Act (ESA) in August 1994. The US Fish and Wildlife Service determined the Bull trout to be warranted for ESA listing in February 1995. Bull trout are also on the Oregon sensitive species list. Snake River summer steelhead have also been listed as threatened by NMFS, and are classified as a stock of concern by the Oregon Department of Fish and Wildlife, and sensitive by the USFS.

OTHER PERTINENT INFORMATION

The project final report has been completed.

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Water Quality Monitoring

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